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# The Western Scholar

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*The Western*

# SCHOLAR

THE SPIRIT OF SCHOLARSHIP AND RESEARCH AT WESTERN KENTUCKY UNIVERSITY



**THE TASK OF THE UNIVERSITY**, Alfred North Whitehead asserted, "is the creation of the future." Across Western's campus, faculty members are doing just that. From art to zoology, creative and dynamic artists and scholars are enriching their classes—and building the Commonwealth's future—through their work in our libraries, studios, and laboratories. This issue of the *Western Scholar* provides an intriguing glimpse of the University's intellectual vitality.

In Potter College, John Warren Oakes of the Art Department focuses our attention on the often-neglected work of Kentucky's women artists. With Elizabeth Oakes of the English Department, he has curated a Kentucky Museum exhibit, "Kentucky Women Artists, 1850-1970." John and Elizabeth explored the work of 750 women artists who were active in that period. Their exhibit and the findings of their related research enrich our understanding of the Commonwealth's artistic traditions. In another arts field, dancer-choreographers Lees Hummel and Stephen Stone recently received a \$10,000 grant from Dance/USA to bring two artists-in-residence to campus in 2002. Besides their work on campus, the visiting artists will present lectures and demonstrations in area schools and present a Master class for community dancers. From the English Department, Deborah Logan, a prolific junior scholar, discusses her work on Harriet Martineau, a mid-19th century writer and social critic. Through her writing and editing, Deborah is broadening our understanding both of Martineau herself and the complex Victorian society in which she lived.

From Ogden College, Geography and Geology Department Head David Keeling discusses his work on transportation and economic development in Latin America. Fascinated by the impact of globalization on



developing countries, David stresses geography as a crucial ingredient to understanding social structure. H. Youn Kim of the Gordon Ford College of Business also stresses an international perspective in his research in economics. An expert on consumption and production theory, his complex work is largely presented in the international language of mathematics. From University Libraries, Gay Perkins draws on her social science background to apply that methodology to library management issues. In the College of Education and Behavioral Sciences, psychologist Joe Bilotta and his research team are "building the future" with zebrafish. Research on a host of vision issues involving this species are pointing us toward cures for certain forms of blindness and spinal cord injuries.

Finally, the *Scholar* includes a special article on Western alumnus Harry Gray. A 1957 graduate, Professor Gray has been a faculty member at California Institute of Technology for 25 years. A prominent chemist internationally known for his work on electron tunneling in proteins, he is a major figure in research related to Alzheimer's Disease. His comments on his student years at Western illustrate the important impact faculty research agendas can have on students.

This issue of the *Scholar* is another reminder of the Western's intellectual vigor. Across our campus, the intellectual work of faculty members is creating the future and educating the students who will build the dreams of the 21st century. Even in this era of sweeping change in higher education, this partnership of faculty and student in pursuit of new learning remains the core of a truly dynamic university.

*David Lee, Dean*  
Potter College of Arts,  
Humanities and Social Sciences

# Fishing for Answers in the Neuroscience Laboratory

BY DAVE SHINALL

## **ONE RESEARCHER AT WESTERN KENTUCKY UNIVERSITY CRUSHES THE OPTIC NERVES OF ZEBRAFISH AND WATCHES THE NERVES GROW BACK.**

Another trains zebrafish with colored light and shrimp dinner rewards.

Still another researcher wants to see if growing up in a blue world will have zebrafish seeing red — or green, for that matter.

Western Kentucky University psychology professor, Dr. Joseph Bilotta, hopes his team's work with zebrafish will one day lead to cures for certain forms of blindness and spinal cord injuries. Bilotta heads an elite unit of eager and determined undergraduate and graduate students interested in neuroscience research.

Bilotta and his students take a holistic approach in their investigations that blend behavioral psychology and the physiology of sight.

"We're trying to compare the visual processing at the eye with the visual processing at the brain, and then, the visual processing of the whole animal," Bilotta said.

"For me, that's the most fascinating part," Bilotta said. "To put it all together." In addition, Bilotta points out that the research activity that takes place in the laboratory also provides a place for students to learn about neuroscience and research in general. "For me, teaching and research are the same thing; when I'm in the laboratory, I'm teaching." The laboratory not only produces high quality research, but high quality students. Many of his students have gone on to doctorate programs in psychology and neuroscience as well as medical school. The integration of Bilotta's teaching and research efforts is illustrated by the

fact that he has been awarded both teaching awards and research awards. He won the College of Education and Behavioral Sciences award for excellence in research/creative activities in 1996 and excellence in teaching awards in 1993 and 2000. Dr. Bilotta was awarded the University award for excellence in teaching in 1993 as well.

Students working in the laboratory learn that they have to work together and help each other. None of the research in the laboratory can be done by a single person; everyone has to help each other. "Everyone has a project that is their main project; however, when someone needs help collecting data, analyzing data or taking care of the fish, everyone pitches in," Bilotta says. "It is a real team effort."

The centerpiece of his team's current research is optic nerve regeneration.

Graduate student, Angela McDowell, is in charge of the laboratory's neural regeneration project.

"I crush the optic nerves," McDowell said. Then, to measure how the zebrafish neurons grow back, McDowell inserts hair-like microelectrodes into their tiny brains. In a similar project, undergraduate students in the laboratory insert similar electrodes into the retinas of zebrafish larvae, which are about three millimeters in body length.

Unlike humans, when the optic nerves of zebrafish are destroyed, zebrafish optic nerves repair themselves. The repair takes about a month.

Learning how the fish perform this miracle may yield hope for millions of people now visually impaired.

Unlocking the secrets of how zebrafish regenerate crushed optic nerves may also teach doctors how to re-





*Dr. Joseph Bilotta points out features of zebrafish to graduate student Angela McDowell.*

build damaged spinal cord neurons in people disabled by accidents.

"That's why this research is very hot and very fascinating and on the cutting edge," McDowell said.

As far as doctors repairing humans' crushed optic nerves and severed spinal cords with the fruits of her research, McDowell remains hopeful.

"I think someday we'll be able to do that," she said.

Bilotta, who earned his doctorate in experimental psychology from the City University of New York, has been working on zebrafish visual system development and optic nerve regeneration for about six years at Western.

Zebrafish are ideal for this kind of research.

"It's a great little species for studying developmental neuroscience because as soon as the lights go on in the morning, the female lays the eggs," said Bilotta, who added his school of zebrafish varies from 50 to 60, and one morning produced 1,200 eggs.

"And you know," he said, "the amazing thing is someone had to count all twelve hundred of them. That's another example of how everyone pitches in."

Because zebrafish crank out new generations on a regular basis, mutations, which take several generations to show up, show up rapidly in zebrafish. Plus, Bilotta said, researchers can choose from zebrafish at every stage of

development to study, from embryos to those embryos' great-great-great-great-grandparents.

All the work takes place in the Neuroscience Laboratory. The Laboratory, located on the second floor of Western's Tate-Page Hall, consists of three rooms, each the size of a small jail cell.

The concrete block walls of one room are lined with racks of aquariums that hold gray-green, black-striped zebrafish of different ages and sizes. They live about a year and grow to nearly an inch.

One covered tank contains 15 baby fish swimming in a cool, blue glow. These zebrafish have never seen any light other than blue light.

"What happens when you're raised in an environment," asked Bilotta, "where you don't need red and green receptors? Will you develop them anyway? Will you develop more blue receptors because that's the light you've been exposed to?"

This project belongs to graduate student Lee Dixon, from Dayton, Ohio. He hopes to learn what color of light the eye needs to develop properly. Dixon estimates the experiment will take another four months to complete.

"I didn't know much about vision to start with," Dixon said, "and I've learned how complex it is and how everything has to work just right for vision to turn out perfectly."

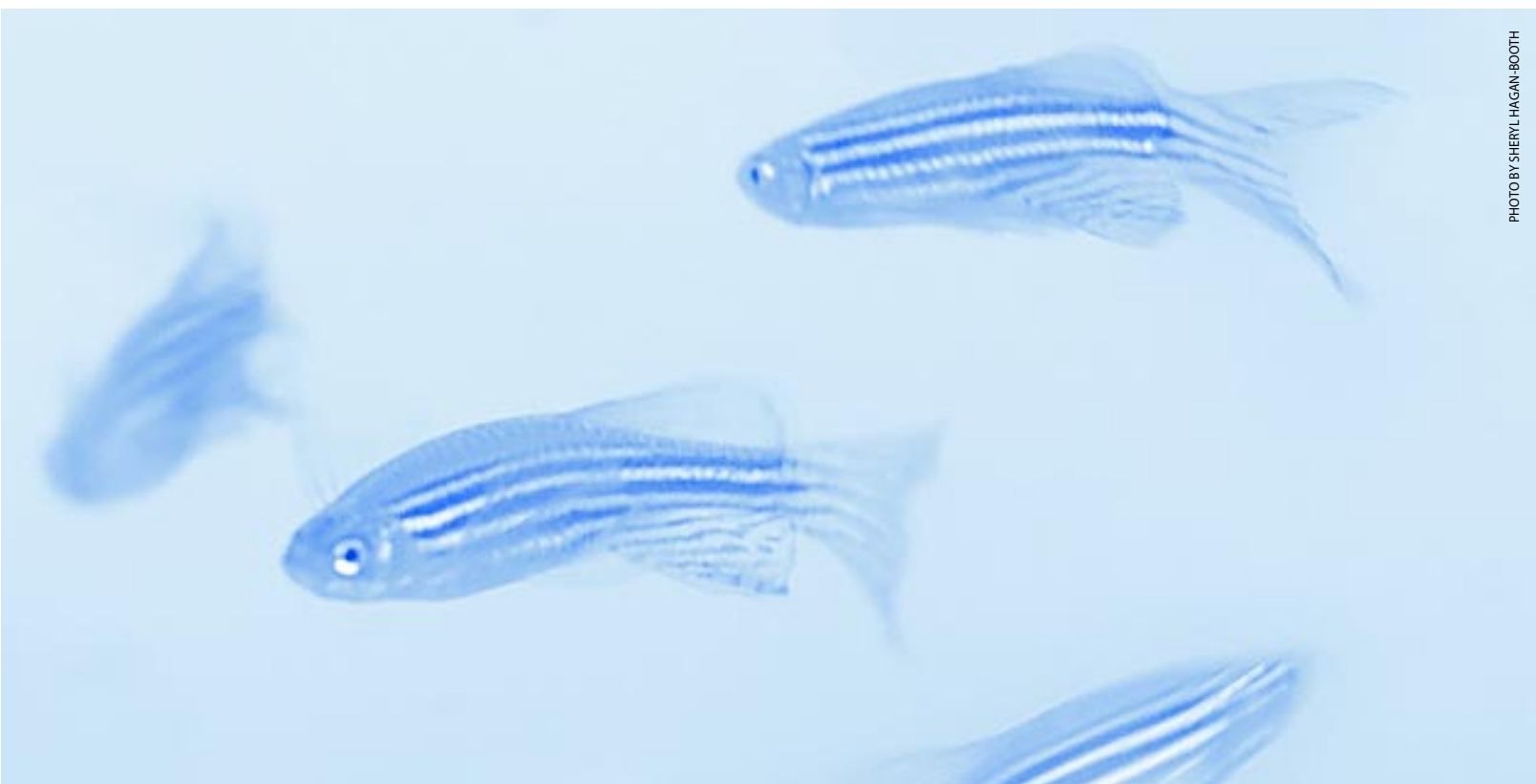


PHOTO BY SHERYL HAGAN-BOOTH



PHOTO BY SHERYL HAGAN-BOOTH

Angela McDowell gets the equipment prepared for an experiment involving a zebrafish.

University of Washington biologist Susan Brockhoff echoed Dowling's praise.

"These studies are critical as a framework on which to analyze retinal mutants," wrote Brockhoff in *Concepts and Challenges in Retinal Biology*.

Another graduate student who works in the Neuroscience Laboratory is Erin Davis. She explores vision's effect on their behavior; for her zebrafish, color has meaning. Davis is working on a project that began several years ago in the laboratory. Davis trains her zebrafish to respond to different colors of light, and for them, color means food.

Davis uses a method pioneered by behavioral science icon B.F. Skinner. Skinner trained lab rats to press a bar in order to receive a food reward.

Davis uses brine shrimp as a reward. So far, Davis has trained her zebrafish to swim toward different colors of light shined into stalls at the end of a small black aquarium.

For the past two years, Davis has continued to improve and modify the procedures of previous students in the laboratory to perfect this technique on zebrafish. She has patiently spent hours each day sitting in a tiny, dark room bribing her frenetic little fish to swim to different colored lights and earn their shrimp dinners.

"I think some people kind of giggle at the fact I go in there and train the fish for two or three hours a day, but I really enjoy it," she said.

## ***'What happens when you're raised in an environment where you don't need red and green receptors? Will you develop them anyway? Will you develop more blue receptors because that's the light you've been exposed to?'***

"The research we're doing helps us understand not just how vision works," Dixon explained. Every little building block is a piece of the puzzle, and that picture gets clearer and clearer, and I hope to add a couple of pieces before I leave."

Dixon presented details of his work to an estimated 8,000 members of the Association for Research in Vision and Ophthalmology at the group's Ft. Lauderdale convention last May.

Fellow researchers view the work done by Dr. Bilotta at Western with respect and gratitude.

Grateful colleagues include Harvard University biologist John Dowling, author of books on retinal biology.

"They are clearly at the forefront of such work," Dowling said of Bilotta's work. "My laboratory is interested in visual mutants in zebrafish, and Joe's work has been exceptionally helpful to us."

"I hope to be able to provide the behavioral evidence that zebrafish are an excellent model to use in vision research," she said. "When you think about it, working in the Neuroscience Laboratory, not only do you get to collaborate with current members of the laboratory, but former members as well. The project I am working on now was started by former students."

In addition to the work on visual neuroscience and development, the lab has begun a series of experiments examining the consequences of embryonic exposure to various chemicals or teratogens. For example, they have exposed zebrafish embryos to various doses of ethanol and examined the effects on anatomical, physiological, and behavioral development. The short-term goal of this work is to develop the zebrafish as a model for fetal alcohol syndrome; the long-term goal is to use this information to help prevent this debilitating disorder in humans.



# HARRIET MARTINEAU: VICTORIAN POLYMATH

BY MAGGIE HILLIARD

**TEACHING STUDENTS HOW TO DO RESEARCH IS NOT JUST TAUGHT FROM THE BOOK IN DR. DEBORAH LOGAN'S CLASSROOMS. SHE TEACHES FROM HER OWN EXPERIENCES AS WELL. DR. LOGAN BELIEVES THAT "RESEARCH IS INTEGRAL TO THE LEARNING AND TEACHING PROCESS AND IS AN ESSENTIAL PRACTICE THAT SHOULD NOT BE ELIMINATED, BUT, RATHER, 'STEPPED-UP' AFTER GRADUATE SCHOOL."**

Dr. Logan is on her way to becoming a preeminent scholar of Victorian literature and culture and an authority on Harriet Martineau. Dr. Logan is also an assistant English professor up for early tenure this year. She is working to disprove the idea that "teaching and research are separate, unrelated activities. Both are, in fact, integral to all academic endeavors," she said.

Dr. Logan is originally from Scranton, Penn., and earned her bachelor's degree from Hamilton College in New York and her master's degree and doctorate from the University of North Carolina at Chapel Hill. While studying 19th-century British literature, with an emphasis on Victorian studies and the novel, Dr. Logan finally found the person that she would spend many years researching: British writer Harriet Martineau.

During her undergraduate education, Dr. Logan said, she had so little exposure to women writers that she began to request independent studies so she could uncover the history that was left out of so many of her courses. She was seeking to find out "why these women had been written out of literary and social history," she said.

Logan's thesis and dissertation on the status of women in the 19th century and on women writers became her first book, *Fallenness in Victorian Women's Writing*. While conducting this research, she discovered Martineau.



*Dr. Deborah Logan looks at a display concerning Victorian women in Western Kentucky University's Kentucky Museum.*





"I was intrigued with Harriet Martineau because, when I first discovered her, I wondered why I had never heard about her before," she said. "The more I studied her life and her writings, the more I was convinced that she was someone who was really important." Dr. Logan discovered that Martineau's significance is wide ranging in that her writing incorporates politics, history, biography, sociology, philosophy, political economy, journalism, religion and literature. In modern terms, Harriet Martineau's works are genuinely interdisciplinary, an increasingly viable pedagogical approach in 21st century academia.



ILLUSTRATION BY TOM MEACHAM

Martineau's impact on Victorian culture is impressive by any standards. Her *Illustrations of Political Economy* (consisting of 25 tales) sold 10,000 copies each, with an estimated readership of nearly 150,000. The series, which "popularized" classical political economy for the general reader, was translated into several European languages. Its reception history far surpasses that of the works of her more famous contemporaries, like Charles Dickens and John Stuart Mill. Martineau was subsequently "courted" by Parliamentary members to write two more series, *Illustrations of Taxation* and *Poor Laws and Paupers Illustrated*. For her writing on industrial British society and pre-Civil War America, Martineau has been called the "first woman sociologist." Her later career as a journalist earned her the title, "the first and greatest woman journalist."

In addition to writing analyses and critical studies of Martineau's writing, Dr. Logan is working toward bringing

Martineau's writing back into print to revive the Victorian scholar's contributions to these disciplines. She has applied for two grants from the National Endowment for the Humanities that will allow her to continue her research in manuscript collections overseas as well as throughout the U.S.

One of Logan's outstanding grants concerns her forthcoming five-volume reprint of Martineau's writings on the British Empire that will be published by Pickering & Chatto. Logan hopes to spend one month in England conducting research, primarily at the British Library's East India Company collection, Trinity College Library in Dublin and the University of Birmingham (United Kingdom) to piece together the introductions to her forthcoming series. She plans to complete the series in April 2003, with publication scheduled for fall 2003.

Her other grant application aims at a larger and more time-consuming project: the collected letters of Harriet Martineau. There are approximately 2,200 letters in the United States and Britain to be assembled for this collaborative research project. Logan's project will be co-edited by fellow Martineau scholar Dr. Valerie Sanders of the University of Hull (United Kingdom). The authors anticipate a 2005 publication date for this five or six volume collection.

Dr. Logan has been studying Martineau since 1992, conducting research for three books, all forthcoming in 2002: *Harriet Martineau and America's Martyr Age*, *The Hour and the Woman: Harriet Martineau's 'somewhat*

***Martineau was a very strong and self-sufficient intellectual woman whose greatest strength was as a social problem writer.***

***Her writing incorporates politics, history, biography, sociology, philosophy, political economy, journalism, religion and literature.***

*remarkable' Life*, and *Selections from Harriet Martineau's "Illustrations of Political Economy."* Her writings have also been published in five journal articles on Martineau and in papers presented at 13 professional conferences, with three more taking place this fall, as well as several colloquia at Western Kentucky. Most recently, she presented a paper about



Martineau's transatlantic abolitionism at Yale University's Gilder Lehrman Center for the Study of Slavery, Resistance, and Abolition.

"I see my role as a researcher as that of making women writers and their texts available to new generations of readers, to provide a more comprehensive picture of literary history than has been available thus far," Logan said.

Logan notes that publishers are sometimes reluctant to do reprints. However, she has secured publishing commitments from companies in the United States, Canada and Britain so far, which attests to Martineau's growing popularity and continued relevance. Logan's reprint volumes are critical editions that include Victorian and modern supplementary texts and are intended for use in classrooms as well as libraries.

"Martineau never hid her identity as a woman, as did other Victorian women writers," Dr. Logan said. "She was criticized because she wasn't writing romance novels, nor did she use a male pseudonym. Martineau is notable for her participation in 'serious' non-fiction writing, work traditionally considered to be the province of male writers only."

She also believes that if Martineau is more prominently featured in college textbooks and classes, it will provide female scholars with a positive example of a woman non-fiction writer. Such role models, Logan emphasizes, provide women students with the tools to overcome intellectual prejudices and confront gender-based criticisms. Martineau, for example, was often criticized for her gender as well as for her disability, deafness, rather than having her writing assessed according to literary standards. This in part explains, in Logan's opinion, Martineau's exclusion from academic study.

"According to traditional textbooks, there are few strong, women political figures throughout history, so

***Martineau was often criticized for her gender as well as for her disability, deafness, rather than having her writing assessed according to literary standards.***

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many students go through school thinking that the absence of female role-models proves that women are inferior to men," Dr. Logan said. "But women have been systematically eliminated from academic, no less than social, history. I participate in the ongoing academic research aimed at recovering these women and restoring them to their rightful place. Martineau was a very strong and self-sufficient intellectual woman whose greatest strength was as a social problem writer." She focused on such issues as gender, race, and class, a paradigm popular in today's university classrooms.

Logan's research has led her to find a missing piece of history, and her insightfulness has led her to encourage us all to rediscover the past. By doing this, we can face the future with a more accurate understanding of women's intellectual contributions through knowledge of our "literary grandmothers."

"Just as Martineau represented the 'spirit of the Victorian age,' so also does the work of women scholars on women writers represent the spirit of academia in the postmodern era," Logan said.

Books by Dr. Deborah Anna Logan, Ph.D.

*Fallenness in Victorian Women's Writing. 'Marry, stitch, die, or do worse'* Columbia and London University of Missouri Press, June 1998.

Editor, Reprint and critical edition of Harriet Martineau's *Illustrations of Political Economy*. Forthcoming from Broadview Press, Fall 2001.

*The Hour and the Woman: Harriet Martineau's "somewhat remarkable" Life*. Forthcoming from Northern Illinois University Press, Spring 2002.

Editor, anthology of Harriet Martineau's writings on pre-Civil War America entitled *Harriet Martineau and America's Martyr Age*. Forthcoming from Northern Illinois University Press, Spring 2002.

Editor, *Harriet Martineau's Writing on the British Empire*, 5 volumes. Forthcoming from Pickering & Chatto, 2003.

# Global Read

BY TOMMY NEWTON

**GLOBALIZATION IS THE DRIVING FORCE IN TODAY'S SOCIETY AND DAVID KEELING WANTS TO PROVIDE THE ROADMAP FOR STUDENTS AND COMMUNITIES, GOVERNMENTS AND POLICYMAKERS. "OUR CHALLENGE AS EDUCATORS IS REALLY TO TEACH AS MANY PEOPLE AS POSSIBLE ABOUT THE WORLD AROUND US," DR. KEELING SAID. "BECAUSE IF YOU MAKE DECISIONS AND YOU MAKE POLICY WITHOUT UNDERSTANDING PEOPLE AND PLACES THEN YOUR POLICES ARE DOOMED TO FAIL-URE BECAUSE YOU DON'T UNDERSTAND THE IMPLICATIONS."**

Geography and science is the keys to understanding, according to Dr. Keeling, head of Western Kentucky University's Department of Geography and Geology.

"If you're going to understand people or places and how society structures itself, you have to understand geography," Dr. Keeling said.

and writing has focused on spatial development, economic, global trade and transportation issues facing Latin America. His published works on the region include "Buenos Aires: Global Dreams, Local Crises"; "Contemporary Argentina: A Global Perspective"; and chapters on transportation issues in "Regional Development and Planning for the 21st Century" and "World Cities in a World System." He has also published a number of articles in journals specializing in research on developing regions of the world.

Dr. Keeling remains keenly interested in how other developing nations are coping with the demands of globalization. "We're much more globally connected now technologically, politically and economically than at any time in human history," he said. "If you think about it, now for the first time we can make anything anywhere on the planet and sell anything anywhere on the planet."

***A lack of understanding of geography and geopolitical issues has been evident in the wake of the September 11 attacks on America, according to Keeling. Most Americans – from media commentators to government officials – don't understand the economic, social and geographic issues facing nations like Afghanistan or Pakistan.***

A lack of understanding of geography and geopolitical issues has been evident in the wake of the September 11 attacks on America, he said. Most Americans – from media commentators to government officials – don't understand the economic, social and geographic issues facing nations like Afghanistan or Pakistan.

Geographers like Dr. Keeling can analyze the human development aspects and help provide policy direction for those making crucial decisions. "Good scholarship should not only be for intellectual purposes, it should be for practical purposes as well," he said.

For the past 15 years, much of Dr. Keeling's research

An exciting new opportunity in the global arena for Western is research and development opportunities in China and Dr. Keeling has begun working on several exciting projects. With his colleagues in the Hoffman Environmental Research Institute, a research center in the Department of Geography and Geology, Dr. Keeling is helping to develop a long term, interdisciplinary study on the intersection of economic development, environmental change, regional policy, tourism, and resource use in southern China. "This research will engage undergraduates and graduates in development issues of critical importance to China over the coming decades," he said. "But it will also





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contribute to stronger relations between scientists in our two countries and will help us to understand more clearly this very important nation of over 1.2 billion people." The development of new technologies and research methodologies in the Department, such as Geographic Information Science (GIS) and dynamic spatial modeling, is providing new opportunities for students and opening new research areas for Dr. Keeling and his colleagues. "It's an exciting time to be in geography and the sciences at Western," he said.

By traveling to other countries and conducting research, Dr. Keeling gains a better understanding of people's problems and how governments respond to those problems. "We don't live in a homogenous environment spatially. Different parts of the city have different characteristics, different landscape features, different economic implications, different economic features."

Dr. Keeling is in a unique position to help students, community leaders, government officials, policymakers and others understand the role geography plays in the globalization. "That business experience exposed me to a lot of global issues," Dr. Keeling said. In the late 1980s, he decided that geography "was the place to be" and he became interested in Latin America. Dr. Keeling received his bachelor's, master's and doctoral degrees at the University of Oregon.

Since the 1960s, the native of Cheltenham, England has traveled to about 170 countries.

"I've always been a traveler," Dr. Keeling said. "When I was 10 years old, my family migrated from England out to Australia. We went out on a migrant ship, sailed through the Suez Canal and visited Egypt and Yemen and I really got entranced and enthralled with different peoples, places and cultures."

But his interest in geography also grew out of his experience in the business world. In 1979, he received a degree in business from North Sydney College in Sydney, Australia. He spent much of the 1970s and 1980s in business-related positions.

"I really became interested in this whole notion of human development," including the different ways of thinking about how society develops and how place really matters, he said. That can be a challenge, especially when many Americans have limited geographic knowledge and don't understand global issues. "It's a big mission," he said. "It's a tall order to successfully spread the gospel of geography to society."

"Part of what I do in my research, in my classes and in my public service work around the country and around the world is to really try and promote that perspective that we really have to think about how people and place interlock," he said.



But through his work as a faculty member, National Councilor for the American Geographical Society, and with other groups, Dr. Keeling is striving to bring a multidisciplinary approach to global issues. "You can't solve problems from a single perspective because problems don't evolve like that," he said. "It doesn't matter what career you choose, whether it's business, planning or science, you've really got to look at things from a global perspective."

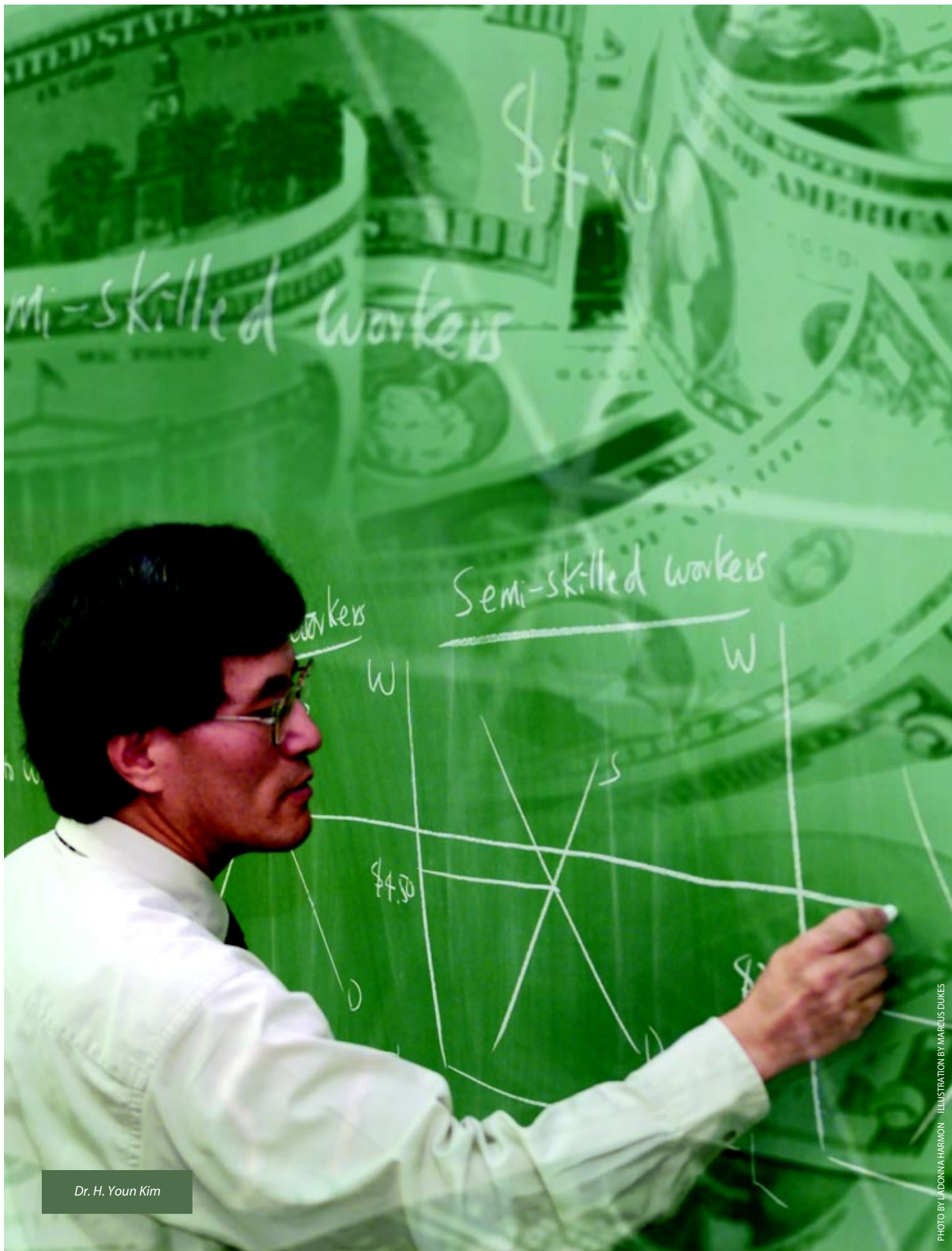
For example, Dr. Keeling is part of a Latin American studies program that includes Spanish, anthropology, political science, history and geography courses, is working with other administrators on strengthening the University's Asian studies program and helps promote the Study Abroad programs.

Dr. Keeling, who frequently travels abroad with other faculty members and with students, believes each student should have international experiences before leaving Western. "I'm a very strong promoter of a globalization perspectives, not just in terms of the impacts that globalization is having but the problems that globalization is causing on human development." In Dr. Keeling's research and travels he observes the impacts on human development that aren't limited to the geopolitical issues. In traveling the world, "you get to see the powerful impact of Western culture."

A long-term project for Dr. Keeling is a textbook on the cultural geography of popular music. "I've always had an interest in popular music," said Dr. Keeling, who was drummer in a rock band in the 1960s. The idea for the textbook stemmed out of his courses in the geography of rock 'n' roll and popular music. "Geography is such a neat discipline and is incredibly exciting," he said. "It's really one of the best jobs in the world." Geography is also a job and field that requires more than the basics of memorizing countries, capitals and rivers. "That side of geography is very important but that's only a small percentage of what geography is," he said. "Geography is about analyzing and interpreting the human environment relationship and understanding how things work globally, regionally and locally."

Through his travels, research and professional activities, Dr. Keeling is "somewhat of a global ambassador for Western and its programs." "At a national and international level through my work, Western Kentucky University gets a lot of exposure. Not only do I carry the flag of geography with me when I go, but I carry the flag of Western Kentucky University," said Dr. Keeling, who has visited about 50 countries since coming to WKU in 1993. "There's a lot of global work to be done," he said. Western is on the way to becoming successful as a comprehensive, nationally recognized institution by taking advantage of its global opportunities.





Dr. H. Youn Kim



**THE FRUIT OF DR. H. YOUNG KIM'S 20 YEARS OF RESEARCH IN THE FIELD OF ECONOMICS SITS IN STACKS OF PAPERS ON HIS DESK AND IN THE VOLUME OF BOOKS ON HIS SHELVES. IN A FIELD WHERE THE RESEARCH IS DEMANDING AND THE PROBLEMS ADDRESSED ARE OFTEN COMPLEX, PUBLICATIONS LED TO NEW IDEAS AND DIALOGUE. KIM'S BYLINES IN JOURNALS AND TEXTBOOKS TESTIFY THAT OVER THE LAST 20 YEARS HE HAS BEEN A HEAVY RESEARCHER.**

To a novice his work looks like it is written in a foreign language — and in a way it is. Kim uses mathematics in his research. However, for him the subject always deals with social issues or problems. “Taxes, inflation, unemployment, budget deficits, social welfare — all of these things can be put into perspective by economics,” Kim explains. “I wanted to study in an area that affects people, and that was why economics was so attractive to me,” Kim said. His research involves why people spend and save money, and economic production. “The main type of research I undertake deals with consumption and produc-

“There are many motives for saving, but one of the important reasons people save is because they don’t know what is going to happen in the future,” Kim said. “You may lose your job in the future and so you save. We call it precautionary saving.”

In addition to research on consumption and saving, Kim looks at the firm’s production behavior and cost structure.

“Critical issues concern studying whether firms experience economies of large-scale production and determining the degree of joint production.”

While Kim’s research has taken him across the Atlantic, it is his role as an educator that propels his work forward. He sees teaching as the better half of his work since he came to Western in 1983. “Research is complimentary to teaching, and they should go hand in hand with each other,” Kim said. Like many others, Dr. Kim believes that teachers should always be learning to keep up with current events and research. He said exploring new ideas and giving practical experience with material are two of the

# Economics and Social Issues

**BY JENNIFER L. DAWES**

tion theory,” Kim said. He has presented his papers and research findings from Atlanta to Paris, and his name has appeared as a researcher, author and reviewer for doctorate level textbooks and many economic journals around the world.

Dr. Kim is reserved when talking about his accomplishments and quickly changes the subject back to his current research. “At the center of each new theory and research paper is always a question,” Kim says. Many times the questions are what influences people to consume and to save.

Those same questions often fuel discussion in his classes. One of the first considerations people have when making a purchasing decision is the cost of a given item. His students learn that the price of an item is intertwined with varying incomes which determines how people make their decisions about their consumption.



best advantages he can give his students. He frequently supplements the information in the textbooks with his own findings drawn from research.

Kim has been teaching an array of different economics courses including macroeconomics, microeconomics, public economics and environmental economics at the undergraduate and graduate levels. It was not a future he saw for himself when he decided to major in economics at Sogang University, South Korea, in the late 1960s. Many international students seek Kim's advice when they have similar problems. He said it is difficult to succeed in a college level course being taught in a language with which you are not completely comfortable. Perhaps that is from where his fervor for mathematics comes. Kim believes mathematics is a universal language and it can transcend that roadblock.

Kim came from South Korea to the United States in 1975 after receiving his undergraduate degree at Sogang

***'I don't know exactly how my research will affect the real world... But I definitely hope that it will help people better understand many issues facing them.'***



PHOTO BY LADONNA HARMON

University. Studying in the United States was always one of his goals. He learned to speak English while attending the college run by American priests. However, it was his three years of mandatory military service working alongside American soldiers that taught him the vernacular.

Kim was accepted at the University of Cincinnati where he earned his master's and his doctorate in economics.

Dr. Kim taught classes while working on his doctorate. During those years he also worked for the U.S. Environmental Protection Agency studying the cost of water supply. His main focus was determining the degree of economies of scale and an optimal pricing for water use. Unlike results of other studies, he found that a typical water utility does not necessarily experience economies of scale. This implies that an efficient number of water utilities in a given area may need more than one firm and that current water pricing practices may not be optimal.

This work has been an integral part of his research, and it has slowly evolved over time into his interest in consumption and production theory. Recently, Kim has been researching global finance markets, and to what degree they are integrated or how much they affect each other.

"I came up with a new model of world financial integration and was able to test it," Kim said. "I think I came out with very good results." His model is based on firms' profit-maximizing behavior in contrast to traditional models based on consumers' utility-maximizing behavior. He said his model is able to account for some puzzles in earlier studies.

"Publication is the goal for most researchers," Kim remarked. Economic journals and presentation of papers at professional meetings are the main media for researchers in Kim's field to exchange ideas and through their work, to affect issues like taxes, inflation and social welfare.

Kim's work is published consistently in many prominent journals such as the *Review of Economics and Statistics*, *Economica*, *Journal of Money, Credit, and Banking*, *Journal of Human Resources*, *Journal of Development Economics*, *Journal of Regional Science*, and *Journal of Applied Econometrics*. He also has several working papers currently under review for publication.

Dr. Kim doesn't have any illusions about his work. When a student asks to see a sample of his research, Kim displays a patient smile as the student tries to unravel the secret meaning of the numbers, Greek letters, and multiple variables that affect real problems and possible solutions. Kim is constantly working on research ideas to solve complex economic issues from a different perspective. "I don't know exactly how my research will affect the real world," Kim said. "But I definitely hope that it will help people better understand many issues facing them."

# Fishing for Answers in the Neuroscience Laboratory

BY DAVE SHINALL

## **ONE RESEARCHER AT WESTERN KENTUCKY UNIVERSITY CRUSHES THE OPTIC NERVES OF ZEBRAFISH AND WATCHES THE NERVES GROW BACK.**

Another trains zebrafish with colored light and shrimp dinner rewards.

Still another researcher wants to see if growing up in a blue world will have zebrafish seeing red — or green, for that matter.

Western Kentucky University psychology professor, Dr. Joseph Bilotta, hopes his team's work with zebrafish will one day lead to cures for certain forms of blindness and spinal cord injuries. Bilotta heads an elite unit of eager and determined undergraduate and graduate students interested in neuroscience research.

Bilotta and his students take a holistic approach in their investigations that blend behavioral psychology and the physiology of sight.

"We're trying to compare the visual processing at the eye with the visual processing at the brain, and then, the visual processing of the whole animal," Bilotta said.

"For me, that's the most fascinating part," Bilotta said. "To put it all together." In addition, Bilotta points out that the research activity that takes place in the laboratory also provides a place for students to learn about neuroscience and research in general. "For me, teaching and research are the same thing; when I'm in the laboratory, I'm teaching." The laboratory not only produces high quality research, but high quality students. Many of his students have gone on to doctorate programs in psychology and neuroscience as well as medical school. The integration of Bilotta's teaching and research efforts is illustrated by the

fact that he has been awarded both teaching awards and research awards. He won the College of Education and Behavioral Sciences award for excellence in research/creative activities in 1996 and excellence in teaching awards in 1993 and 2000. Dr. Bilotta was awarded the University award for excellence in teaching in 1993 as well.

Students working in the laboratory learn that they have to work together and help each other. None of the research in the laboratory can be done by a single person; everyone has to help each other. "Everyone has a project that is their main project; however, when someone needs help collecting data, analyzing data or taking care of the fish, everyone pitches in," Bilotta says. "It is a real team effort."

The centerpiece of his team's current research is optic nerve regeneration.

Graduate student, Angela McDowell, is in charge of the laboratory's neural regeneration project.

"I crush the optic nerves," McDowell said. Then, to measure how the zebrafish neurons grow back, McDowell inserts hair-like microelectrodes into their tiny brains. In a similar project, undergraduate students in the laboratory insert similar electrodes into the retinas of zebrafish larvae, which are about three millimeters in body length.

Unlike humans, when the optic nerves of zebrafish are destroyed, zebrafish optic nerves repair themselves. The repair takes about a month.

Learning how the fish perform this miracle may yield hope for millions of people now visually impaired.

Unlocking the secrets of how zebrafish regenerate crushed optic nerves may also teach doctors how to re-





*Dr. Joseph Bilotta points out features of zebrafish to graduate student Angela McDowell.*



build damaged spinal cord neurons in people disabled by accidents.

"That's why this research is very hot and very fascinating and on the cutting edge," McDowell said.

As far as doctors repairing humans' crushed optic nerves and severed spinal cords with the fruits of her research, McDowell remains hopeful.

"I think someday we'll be able to do that," she said.

Bilotta, who earned his doctorate in experimental psychology from the City University of New York, has been working on zebrafish visual system development and optic nerve regeneration for about six years at Western.

Zebrafish are ideal for this kind of research.

"It's a great little species for studying developmental neuroscience because as soon as the lights go on in the morning, the female lays the eggs," said Bilotta, who added his school of zebrafish varies from 50 to 60, and one morning produced 1,200 eggs.

"And you know," he said, "the amazing thing is someone had to count all twelve hundred of them. That's another example of how everyone pitches in."

Because zebrafish crank out new generations on a regular basis, mutations, which take several generations to show up, show up rapidly in zebrafish. Plus, Bilotta said, researchers can choose from zebrafish at every stage of

development to study, from embryos to those embryos' great-great-great-great-grandparents.

All the work takes place in the Neuroscience Laboratory. The Laboratory, located on the second floor of Western's Tate-Page Hall, consists of three rooms, each the size of a small jail cell.

The concrete block walls of one room are lined with racks of aquariums that hold gray-green, black-striped zebrafish of different ages and sizes. They live about a year and grow to nearly an inch.

One covered tank contains 15 baby fish swimming in a cool, blue glow. These zebrafish have never seen any light other than blue light.

"What happens when you're raised in an environment," asked Bilotta, "where you don't need red and green receptors? Will you develop them anyway? Will you develop more blue receptors because that's the light you've been exposed to?"

This project belongs to graduate student Lee Dixon, from Dayton, Ohio. He hopes to learn what color of light the eye needs to develop properly. Dixon estimates the experiment will take another four months to complete.

"I didn't know much about vision to start with," Dixon said, "and I've learned how complex it is and how everything has to work just right for vision to turn out perfectly."

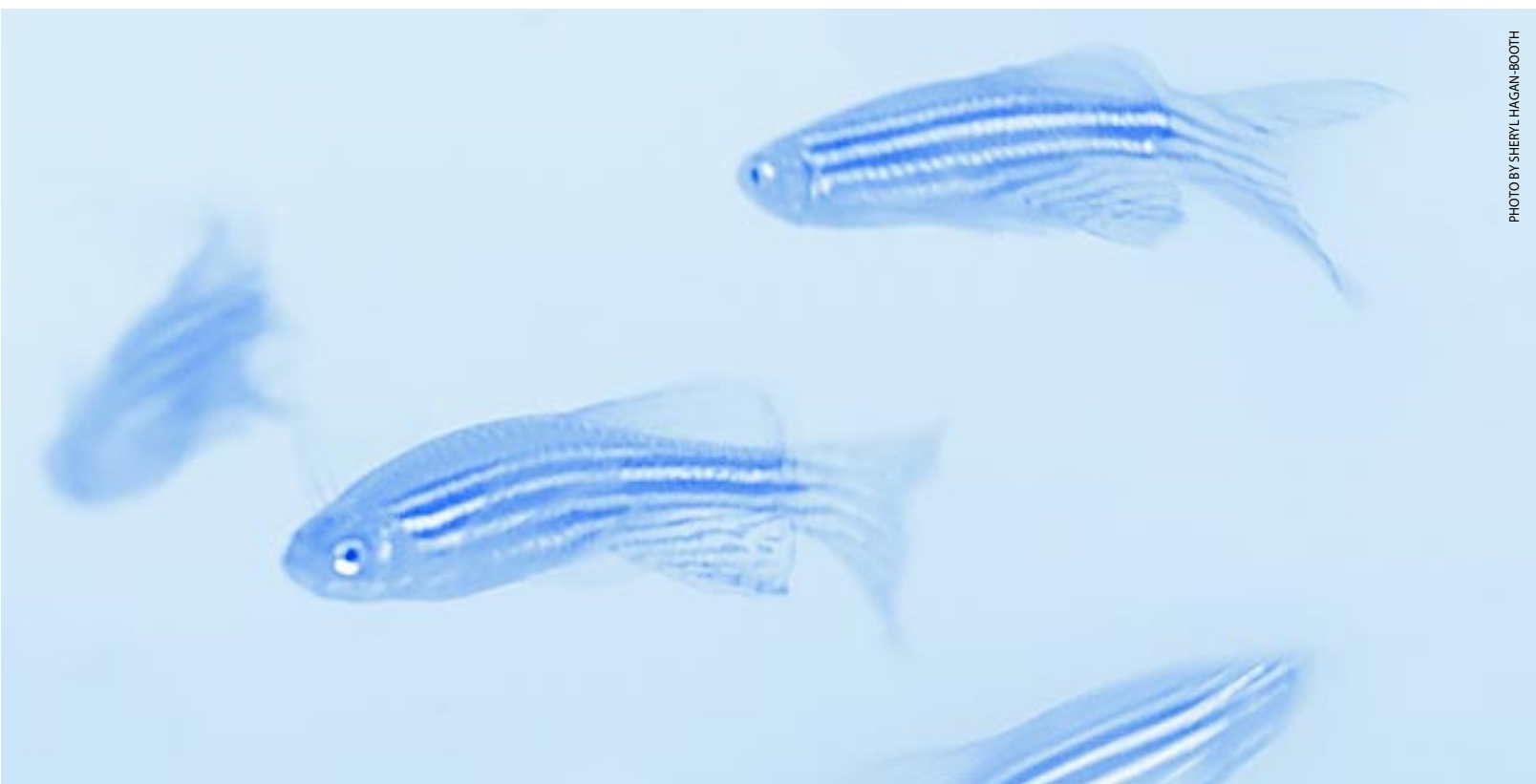


PHOTO BY SHERYL HAGAN-BOOTH



Angela McDowell gets the equipment prepared for an experiment involving a zebrafish.

University of Washington biologist Susan Brockhoff echoed Dowling's praise.

"These studies are critical as a framework on which to analyze retinal mutants," wrote Brockhoff in *Concepts and Challenges in Retinal Biology*.

Another graduate student who works in the Neuroscience Laboratory is Erin Davis. She explores vision's effect on their behavior; for her zebrafish, color has meaning. Davis is working on a project that began several years ago in the laboratory. Davis trains her zebrafish to respond to different colors of light, and for them, color means food.

Davis uses a method pioneered by behavioral science icon B.F. Skinner. Skinner trained lab rats to press a bar in order to receive a food reward.

Davis uses brine shrimp as a reward. So far, Davis has trained her zebrafish to swim toward different colors of light shined into stalls at the end of a small black aquarium.

For the past two years, Davis has continued to improve and modify the procedures of previous students in the laboratory to perfect this technique on zebrafish. She has patiently spent hours each day sitting in a tiny, dark room bribing her frenetic little fish to swim to different colored lights and earn their shrimp dinners.

"I think some people kind of giggle at the fact I go in there and train the fish for two or three hours a day, but I really enjoy it," she said.

## ***'What happens when you're raised in an environment where you don't need red and green receptors? Will you develop them anyway? Will you develop more blue receptors because that's the light you've been exposed to?'***

"The research we're doing helps us understand not just how vision works," Dixon explained. Every little building block is a piece of the puzzle, and that picture gets clearer and clearer, and I hope to add a couple of pieces before I leave."

Dixon presented details of his work to an estimated 8,000 members of the Association for Research in Vision and Ophthalmology at the group's Ft. Lauderdale convention last May.

Fellow researchers view the work done by Dr. Bilotta at Western with respect and gratitude.

Grateful colleagues include Harvard University biologist John Dowling, author of books on retinal biology.

"They are clearly at the forefront of such work," Dowling said of Bilotta's work. "My laboratory is interested in visual mutants in zebrafish, and Joe's work has been exceptionally helpful to us."

"I hope to be able to provide the behavioral evidence that zebrafish are an excellent model to use in vision research," she said. "When you think about it, working in the Neuroscience Laboratory, not only do you get to collaborate with current members of the laboratory, but former members as well. The project I am working on now was started by former students."

In addition to the work on visual neuroscience and development, the lab has begun a series of experiments examining the consequences of embryonic exposure to various chemicals or teratogens. For example, they have exposed zebrafish embryos to various doses of ethanol and examined the effects on anatomical, physiological, and behavioral development. The short-term goal of this work is to develop the zebrafish as a model for fetal alcohol syndrome; the long-term goal is to use this information to help prevent this debilitating disorder in humans.

# The Scholarship of Application

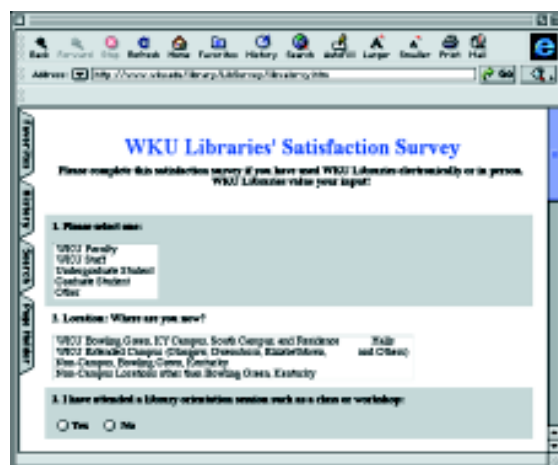
BY MAI P. HOANG

**WHEN DR. GAY PERKINS LEARNS SOMETHING NEW SHE DOESN'T LIMIT ITS USE TO A CERTAIN FIELD. PERKINS, A BUSINESS LIBRARIAN AT WESTERN KENTUCKY UNIVERSITY, IS USING METHODS SHE LEARNED WHILE STUDYING INDUSTRIAL AND COUNSELING PSYCHOLOGY TO ENHANCE THE EFFECTIVENESS OF MANAGEMENT AT THE HELM-CRAVENS LIBRARY.**

"My goal is the scholarship of application – to bring social science topics and methodology to library and information sciences," Dr. Perkins said.

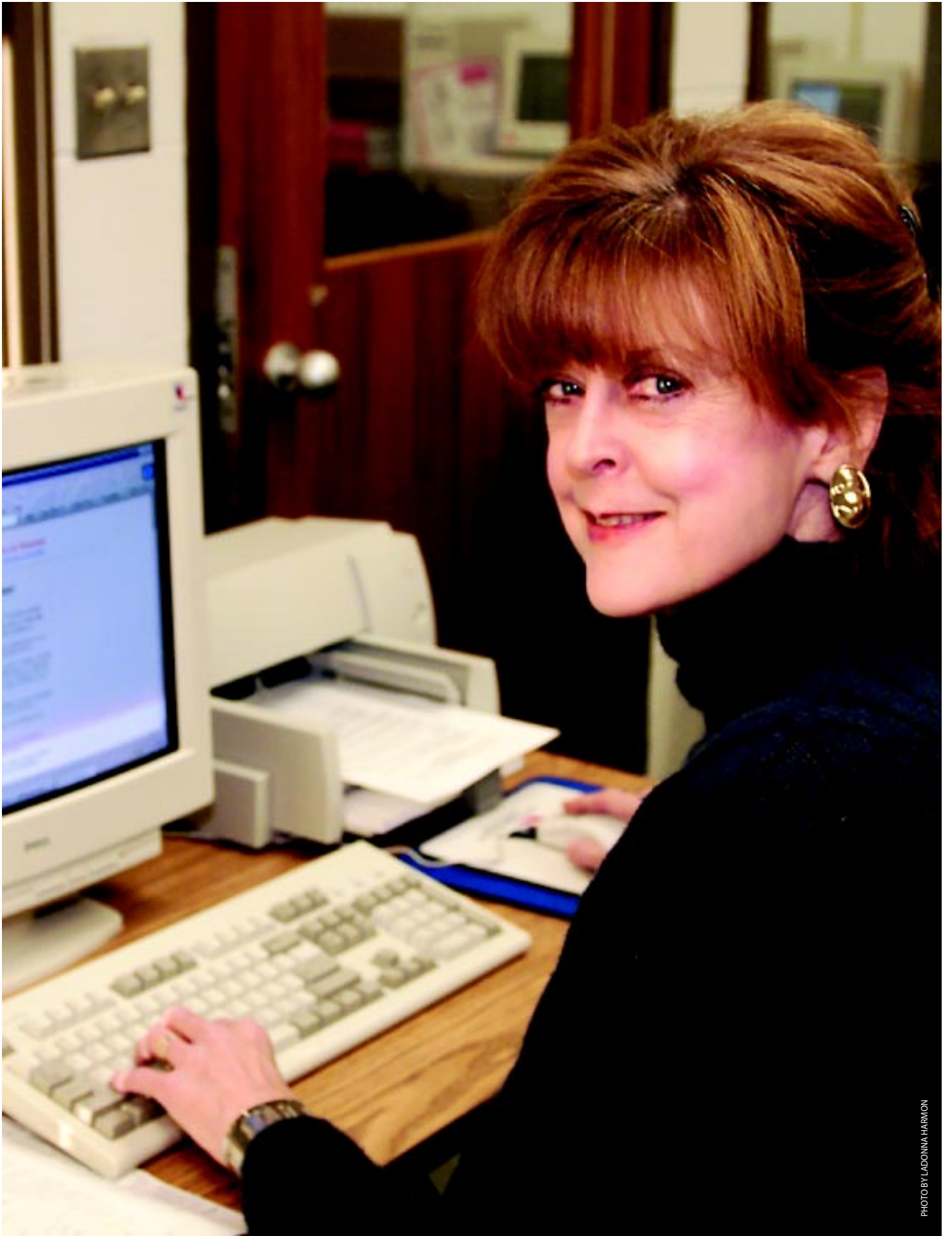
At Western, she uses methods in industrial psychology, such as behaviorally-based performance measurement, upward (subordinate) evaluations, electronic workshop evaluations, and Web based satisfaction surveys to benefit those involved in the field of library and information science. "Much of the methodology has been used in psychology," Perkins said.

Perkins published a summary of relevant articles on behaviorally-based performance measurement, the process of evaluating an individual by rating scales defined by behavioral statements. She applied this technique at Western's libraries. For example, it is meaningful to tell a faculty member, "You received a 'highly effective' rating in research/creative activity and scholarship because you produced a print or nonprint publication of substantive quality or you have demonstrated significant progress on a long-term research project." Using these ratings, an employee's performance and possible promotion can then



be more accurately determined. "When something is a good idea in one field, it's interesting to see how it works in another field," Perkins said.

This review led to piloting another type of evaluation, upward (subordinate) evaluation in libraries. Perkins was instrumental in developing a procedure for library employees to evaluate their supervisors. Supervisors benefited from feedback based on employees' perceptions. The information was not forwarded to higher administration unlike employee performance evaluations. Thus, upward





evaluation was used more for developmental purposes rather than for determining promotions.

Since researching behaviorally-based performance measurement and subordinate evaluation, Dr. Perkins has continued to pursue new projects during her 13 years at Western Kentucky University Libraries. Perkins said her ideas for research have come from library administrators, colleagues and her own personal interests. "For example, you might come across something interesting you read or see on the Internet," Perkins said. After studying a number of library satisfaction surveys on the web, Perkins found that there was limited analysis of the data.

Perkins led a piloted Web-based satisfaction survey and complete data analysis of the results. Colleague Haiwang Yuan used Message Parse and Microsoft Excel to convert the user responses from the Web form to a file usable by data analysis software. Web-based satisfaction survey results could be meaningfully used to evaluate atti-

tudes of remote patrons in an existing library or a virtual university program. The data provide information about demographics and attitudes, enable very broad sampling from the community, and require only inexpensive software and relatively little labor for analysis.

The creation of a program to analyze web data led Perkins to her current research interest, comparing the result of paper-and pencil surveys to those on the Web. Perkins determined that slightly lower ratings were given on Web-based satisfaction surveys; however, these surveys were generally more efficient than paper-and-pencil surveys. The Web-based surveys worked well for a larger sample of people and utilized far less human, time and material resources. Now Perkins is following up the comparison of Web-based and paper-and-pencil surveys. She is increasingly interested in the effect that web technology is having on library and information science.

***Perkins said her ideas for research have come from library administrators, colleagues and her own personal interests. "For example, you might come across something interesting you read or see on the Internet," Perkins said.***



PHOTO BY LADONNA HARMON

Although Dr. Perkins enjoys pursuing her interests, she doesn't hesitate to hear suggestions from others. In past projects she has worked with other library faculty and staff on task forces and with students. This research has given them all, including Perkins, a learning experience.

Dr. Perkins won the WKU Libraries/Technology Research Award in 2001 and has been published in nationally recognized library professional journals.

Perkins had an early eye toward employment and applying what she had learned on the job. She received a B.S. in Hotel and Restaurant Administration at Cornell University and worked as a management trainee at the Rotterdam Hilton Hotel. Upon receiving her doctorate in psychology at the University of Minnesota, she worked in assessment at the Kentucky State Reformatory. While doing both library and site research, she developed a set of behaviorally-based interview questions for the selection of correctional officers. Enjoying the library research, Dr. Perkins then received a library degree and applied at Western Kentucky University Libraries.

# FIGHTING ALZHEIMER'S DISEASE

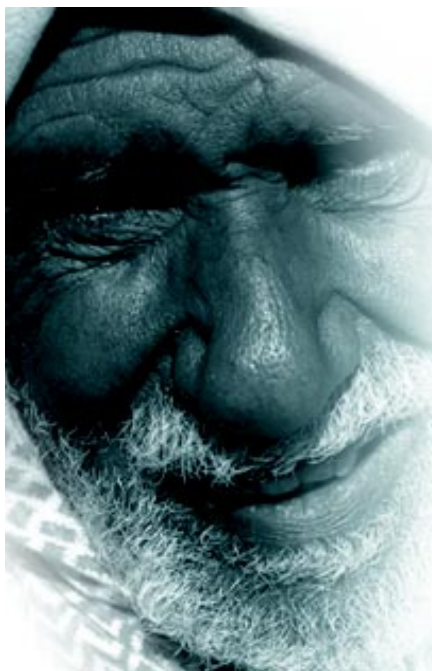
BY SAM YOUNGMAN

**ANYONE WHO HAS EVER WITNESSED A LOVED ONE'S DECLINE FROM ALZHEIMER'S KNOWS HOW PAINFUL IT IS NOT ONLY FOR THE VICTIM, BUT ALSO THE FAMILY AND FRIENDS.**

Western Kentucky University alumnus Dr. Harry Gray is trying to end that pain.

Dr. Gray is working hard to find how misfolded proteins cause this befuddling disease. He has been recognized widely for his research on electron tunneling in proteins, learning about electron flow in photosynthesis and respiration. He remarked that, "My work also has led to practical applications, most recently in the design and construction of electrochemical sensors that detect viruses and certain types of harmful bacteria. The underlying technology of a very successful company, Clinical Micro Sensors, now a division of Motorola, is based on my early work on electron tunneling through biological molecules."

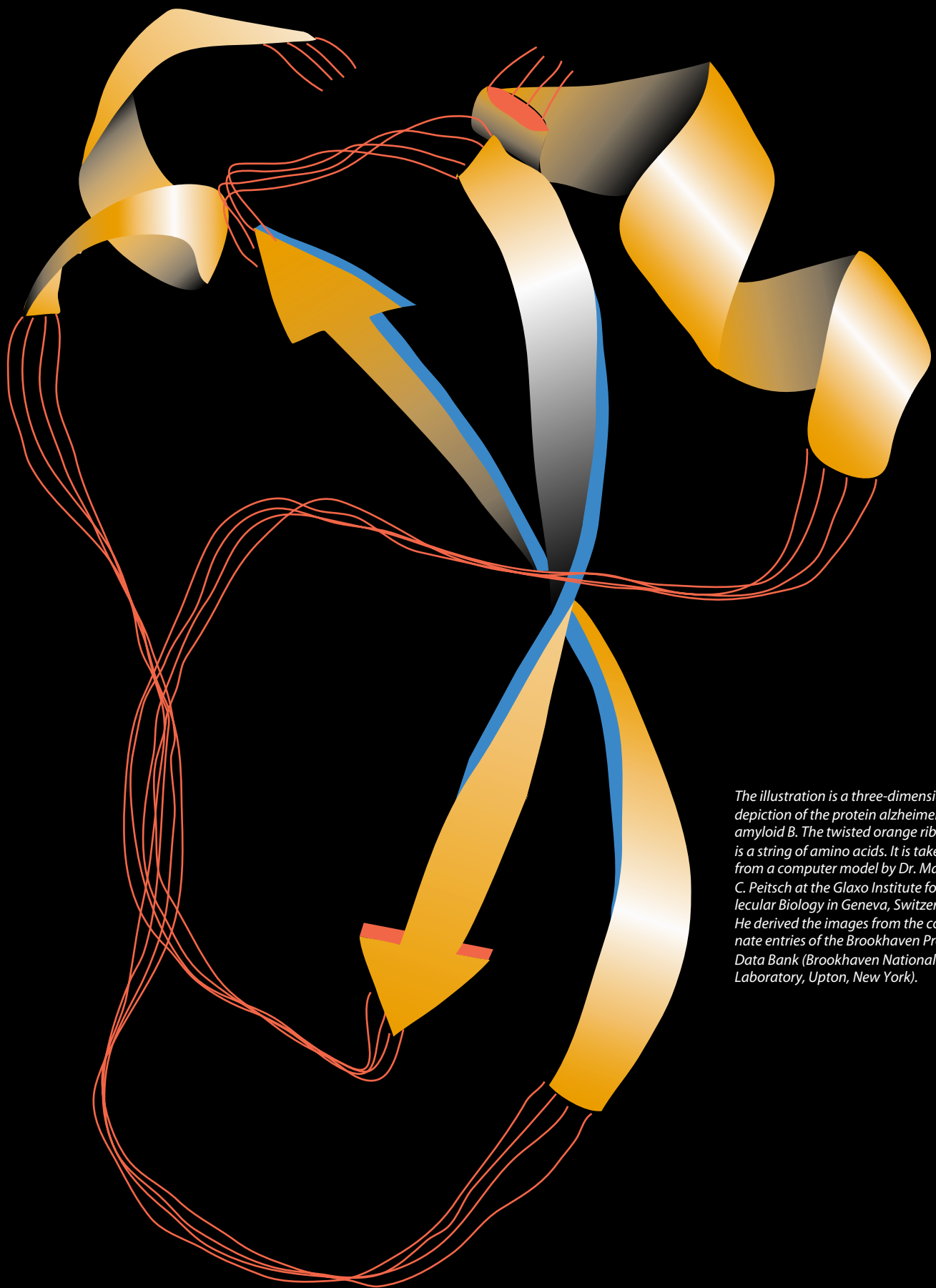
Gray, a 1957 Western graduate, is the Arnold O. Beckman professor of chemistry at the California Institute of Technology. He earned his doctorate



***"There are a lot of diseases due to proteins folding up the wrong way," Gray said. "Alzheimer's is one."***

from Northwestern in 1960, spent a postdoctoral year at the University of Copenhagen, and joined the chemistry faculty at Columbia. There, his main interests centered on the electronic structures and reactions of inorganic complexes. When he arrived at Cal Tech in 1966, he built a group in bioinorganic chemistry to study electron transfer in proteins. Since 1995 much of his work has been aimed at understanding the mechanisms of protein folding. "There are a lot of diseases due to proteins folding up the wrong way," Gray said. "Alzheimer's is one."

But before he took on the daunting task of trying to solve one of the world's most debilitating afflictions, Gray was in the newspaper business. At the age of 10, he started helping deliverymen with their daily routes, tossing the Park City *Daily News* onto the porches of Bowling Green readers before working his way up to the position of assistant circulation manager. Today, Gray attributes his incredibly strong work ethic to his Kentucky roots. "I think if you're close to a farming family, you have a good work ethic," he said. Gray is a man who has worked hard all his life, especially when



*The illustration is a three-dimensional depiction of the protein alzheimer amyloid B. The twisted orange ribbon is a string of amino acids. It is taken from a computer model by Dr. Manuel C. Peitsch at the Glaxo Institute for Molecular Biology in Geneva, Switzerland. He derived the images from the coordinate entries of the Brookhaven Protein Data Bank (Brookhaven National Laboratory, Upton, New York).*





he came to Western where he worked 40 – 60 hours a week in addition to attending school. "I worked very hard when I was at Western," he said. "The reason I work hard is because I love what I do," he said. "It's not work to me. I'm happiest when I'm working on chemistry."

Gray's passion for chemistry research stemmed from his love of playing around with chemicals and his fascination with the colors they create. This voracious appetite for chemistry began at an early age, and was nurtured by Western faculty and students. "I had wonderful chemistry teachers when I was at Western," he said. "The faculty was very supportive." The Western motto is "The Spirit Makes the Master." Gray has become the master, so what does he think of the spirit? "That's me," he said. "That's what I learned at Western. "The spirit does make the master. I've always believed that. It applies all through life."

His résumé reads like a science book. His awards are countless. President Ronald Reagan gave him the National Medal of Science. Great Britain named him a Foreign Member of their Royal Society. He has 17 published books and more than 600 papers. He has received numerous other awards such as the Pauling Medal in 1986, the Linderstrom-Lang prize in 1991, the Gibbs Medal in 1994, the Chandler Medal in 1999, six national awards from the American Chemical Society and 12 honorary doctorates. To list all his awards would be a magazine in itself. But that's not all. His world-wide renown as a chemist is demonstrated in a number of memberships: he is a member of the National Academy of Sciences, the American Philosophical Society, the Royal Danish Academy of Sciences and Letters, the Royal Swedish Academy of Sciences, and he is an honorary member of the Italian Chemical Society. He was California Scien-

tist of the Year in 1988 and he was the George Eastman Professor at the University of Oxford.

In 1995, 30 years after leaving the Hill, Gray was inducted into Western's Hall of Distinguished Alumni.

Gray said he took more than a degree and two Ohio Valley Conference tennis championships from Western. He also found his wife, Shirley, a fellow 1957 graduate. These days, Gray, originally from Woodburn, Ky., returns to the bluegrass about once a year to visit family. But even in Calif., he can hear the call like bugles on Derby day. "I'm still a Kentucky boy," he said. "You never get that out of yourself." Looking back on the Hill, looking forward to more remarkable success, Gray will tell you Western played a large part in making him the intellectual giant he is today.

"What I really remember was the faculty, and how supportive they were of the students," he said. "It was a nice environment for learning."

Around Kentucky, it's only natural a man's thoughts would turn to the hardwood and the tremendous athletes that dribble up and down it in search of victory.

What does Gray have to say about that?

"Go Big Red."



Dr. Harry B. Gray ('57)

PHOTO BY BOB PAZ



# World Champions

## William E. Bivin Forensic Society

BY DEBORAH T. GIVENS

**"DON'T ARGUE WITH WESTERN," IS THE MOTTO OF THE WILLIAM E. BIVIN FORENSIC SOCIETY. WITH 13 CONSECUTIVE STATE TITLES, NUMEROUS TEAM AND INDIVIDUAL NATIONAL CHAMPIONSHIPS AND THREE CONSECUTIVE WORLD CHAMPIONSHIPS, THERE IS NO DEBATING THE ACCURACY OF THE SOCIETY'S MOTTO.**

Forensics is the practice or study of formal debate. It promotes the disciplines of speech, interpretation and debate, according to the team's website.

Judy Woodring, a Western graduate and director of Forensics, has coached the Western Forensic team for 13 years. The Forensics Society had just been reestablished and named after former University attorney William E. Bivin, who left a bequest to the team in his will. The Society lacked sufficient funding for coaching staff, research materials and travel expenses. "It was a bad situation," according to Woodring. The first time students competed in a national tournament, their expenses were paid by Kassie DePaiva, an actress on the daytime drama, "One Life to Live," and a member of Woodring's former high school team. The Forensics Society had to share a small office and practiced in the hallways.

Woodring credits Provost Barbara Burch for finding the funds to save the program and keep her at Western. At the first department meeting Dr. Burch told Woodring, "You just hang in there."

This year's Fo-

rensics Society boasts 32 members — a large number — since Western's director wants to give interested students the opportunity to participate. "I usually let the uncommitted students eliminate themselves," Woodring said.

Since most practice is one-on-one between team member and coach, Woodring now has a staff of five assistant coaches including Greg Robertson, Matt Gerbig, Scott Gordon, Chris Grove and Jace Luz.

While the Forensics team welcomes "walk-ons," the staff also recruits talented high school students with financial incentives such as housing waivers, tuition scholarships and other scholarships, including the \$350 William E. Bivin Scholarship.

The 2001 competition schedule began with a tournament at Purdue University where Western placed first in the individual sweepstakes. With events almost every weekend, the team then won the team sweepstakes overall, as well as for each portion of the swing.

During the spring semester, Western's strategy changes. The team focuses on qualifying as many members as possible for national competition, by a member finishing in the top six in an event during the year. "That is harder than it sounds," Woodring explains, "since there are often more than 100 competitors in an event."

Forensic competition encompasses four genres.



Members of the William E. Bivin Forensic Society take a break. Pictured left to right are Jenny Corum, Judy Woodring, Alisa Ponananta, Eric Rogers, and Joel Smith.

PHOTO BY SHERYL HAGAN-BOOTH



Debate has the competitive Lincoln Douglas Debate and Parliamentary events. In the Lincoln Douglas Debate, the National Forensic Association selects a topic; this year's topic is, "Resolved: that the United States Federal Government should significantly alter its policy for combating international terrorism." Recent events involving terrorism have led to ongoing preparation for the debate.

The other genres are Limited Preparation with the events Extemporaneous Speaking and Impromptu Speaking; Public Address, which is divided into the events of After Dinner Speaking, Rhetorical Criticism, Persuasive Speaking and Informative Speaking; and Oral Interpretation, which includes the events Dramatic Performance, Duo Interpretation, Prose, Poetry and Programmed Oral Interpretation. Woodring said that work on each speech continues throughout the year to improve the presentation and reflect current events.

To help prepare for competition, team members have a one-hour practicum class each semester. Class time is just the beginning. Students spend numerous hours researching topics on their computers in Cherry Hall, and with the help of Western's librarians, access the Lexis-Nexis database for news and legal materials. Woodring said, "If it was not for the librarians, we could not compete with the Ivy League schools."

Woodring recalls her first student to win a national championship, Robert Mattingly. While just a freshman, Mattingly defeated a senior from William and Mary in a 5 - 0 decision. Woodring said no one believed that a competitor from a regional university could win the event. Mattingly was also the first person to repeat as a national champion, winning again as a senior in 1996. Woodring credits Mattingly's achievement with setting the pace for everyone else. "You are as good as you think you can be," the coach states.



Judy Woodring (right) coaches Auburn, KY freshman Jenni Corum.

PHOTO BY SHERYL HAGAN-BOOTH

***The team focuses on qualifying as many members as possible for national competition, by a member finishing in the top six in an event during the year.***

the team, though, was the chance to meet people from around the country and the world.

Winning Informative Speaking and After Dinner Speaking on our first trip to the I.F.A. International Tournament in Rome, Italy was truly an unforgettable experience. While it was nice being named champion in those individual events, I was most proud of our team. We set out to accomplish a goal of winning the international title, and we succeeded. We were given the unique opportunity to represent Western Kentucky University and let everyone know of the excellence we strive for on "The Hill," and this time not just on the regional, state, or national level, but to the entire world.

Schools around the nation and the world know that when the William E. Bivin Forensic Team from Western Kentucky University shows up that they can truly "expect the best."

A recent honor has included the Seth C. Hawkins Founders Cumulative Sweepstakes Award presented in April 2001 to Western as the school to have accumulated the most sweepstakes points throughout the years at the National Forensic Association national tournament.

Woodring continues to set new goals for the forensic society: to win a NFA individual sweepstakes, and to obtain computer-related technology for the team.

Forensic team members develop exceptional prowess in communication and research. They also have to learn good organizational skills so that they can juggle the practices and competitions. "A lot of being successful is knowing how to manage time," Woodring said. "However, success is not about winning trophies. Awards are great, but we do not want to overshadow the academic part and the educational values."

The four years that I spent as a part of the William E. Bivin Forensic Team at Western Kentucky University has had a tremendous influence on my life both in school and out of school. Perhaps the most rewarding aspect of being a part of

# RESEARCH BRIEFS



PHOTO BY SHERYL HAGAN-BOOTH

*Stephen Stone is an assistant professor of dance, whose emphasis at Western is in ballet and modern dance, and dance company.*

## Dance USA

Lees Hummel and Stephen Stone, two creative and energetic choreographers in Theatre and Dance in WKU's Potter College of Arts, Humanities and Social Sciences, recently received a competitive grant of \$10,000 from Dance/USA. The grant is from the National College Choreography Initiative. The award will bring two professional dancers to campus during the spring semester 2002 to help Theatre and Dance create programs involving the campus and community. This involvement will be achieved by restaging and performing two performances for WKU and community audiences from April 25 - 30, 2002. In addition, Dance/USA's grant makes possible panel discussions with WKU and community participants about the choreographic process; and the artists-in-residence will teach Master classes in community dance studios in Bowling Green. Moreover, the grant will provide funding for them to present lecture demonstrations and performances at Warren

County Elementary and High Schools throughout the semester. One of the artists will participate with the International Studies program to teach community Master classes and perform solo works for the Bowling Green International Festival from April 18 - 25, 2002. Thus, this grant will enhance professional development and student learning, two of Western's strategic goals.



*Lees Hummel is an assistant professor in dance, whose primary areas of dance at Western are in jazz and tap.*

## Disaster Mitigation

The Carroll Knicely Institute for Economic Development at Western received an \$85,500 grant from the U.S. Department of Commerce, Economic Development Administration to conduct Mitigation Planning for 14 counties in West Kentucky. The project will be accomplished through a partnership with Murray State University and be co-directed by Lynn Minton, Associate Director of the Institute for Economic Development at Western Kentucky University and by Dr. Neil Weber, professor of Geosciences and interim dean of the College of Science, Engineering and Technology at Murray State University.

The grant provides funding for "Mitigation Planning Pertaining to Earthquake and Flooding Hazards in West Kentucky." The project area is located primarily in the Pennyryle Area Development District (nine counties), as well as three counties in the Green River Area Development District (Henderson, Union and Webster) and two counties in the Purchase Area Development District (Calloway and Marshall). The project will focus on providing baseline data to mayors, judge/executives, emergency management personnel, county planners and economic development administrators to assist safe growth initiatives in West Kentucky communities.

A county-by-county comprehensive Level I HAZUS (Hazards in the United States) design assessment will be performed to determine the potential damages/losses associated with a flood and earthquake for each of the 14 counties, complete with a customized report for each county. The methodology to be used for pre-planning analysis is named HAZUS and was developed for the Federal Emergency Management Agency (FEMA) by the

## Disaster Mitigation, continued

National Institute of Building Sciences (NIBS). This tool is used for developing loss estimates for use in: 1) anticipating the possible nature and scope of the emergency response needed to cope with a disaster; 2) developing plans for recovery and reconstruction following a disaster and 3) mitigating the possible consequences of the disaster.

Quantitative estimates of losses will be provided in terms of direct costs for repair and replacement of damaged buildings and lifeline systems. Functionality losses that will be analyzed will consider critical facilities such as hospitals, transportation and utility lifeline systems, electrical distribution and potable water systems. The extent of induced hazards will be analyzed for fire ignitions and spread exposed population and building value due to potential flooding and locations of hazardous materials.

This grant will provide local governments with information that will enable them to anticipate the possible nature and scope of the emergency response needed to cope with a disaster. The outcome of this project should unite community constituencies toward a common goal while providing leaders with the knowledge to become better prepared for disasters before they strike to save lives, property, time, money and resources.

## Western Scholar Has Merit

*The Western Scholar* received the Merit Award in the Magazines Category of the Printed Publications Division for the 2001 CASE-Kentucky Awards Program. The Council for Advancement and Support of Education (CASE) is the organization for university and college professionals who work in alumni relations, communications, and development. The winning entries were displayed at the CASE-Kentucky Conference in Lexington, December 13-14.



Dr. Wei-Ping Pan

## Coal Energy

Dr. Wei-Ping Pan, professor of Chemistry, has received a research grant for \$129,446 from the Electric Power Research Institute, Inc. (EPRI) to do "Field Testing Combining High Chlorine Coal with Control Technology to Minimize Mercury Emissions." The study's objective is to increase the efficiency and lower the cost of mercury emission cleaning methods by using HCl to convert elemental mercury to oxidized mercury species. The project will tackle the problem of getting rid of the water insoluble elemental mercury to improve the quality of coal as an energy source. It will assist the Environmental Protection Agency (EPA) with its evaluation of the need to regulate mercury releases into the environment. Pan's research is a response to Congressional mandates in the Clean Air Act Amendments of 1990 and the resulting EPA Mercury Study Report and the Study of Hazardous Air Pollutant Emissions from Electric Utility Generating Units Reports. The project will continue to define a definitive solution to the need for mercury regulation. Its results will be significant for federal agency regulations, health researchers concerned with the effects of environment pollutants on the health of humans and wildlife.

This project will improve energy efficiencies in municipal waste combustion systems. The objective is to demonstrate how to remove up to 90 per-

cent of the mercury from coal. The project builds upon Pan's research at Western. Thus far, he has "burned off" about 70 percent of the total mercury in coal. The residue was absorbed by the fly ash and flue gas. His preliminary results show the potential use of high chlorine coal to control the emission of elemental mercury during combustion. His work has helped EPRI to conclude that the

chlorine concentration in the coal was one of the most important variables with respect to influencing mercury speciation and removal.

The project is a collaboration to improve the mercury data quality by obtaining more data and over a longer sampling period than possible up to this time. The 18 month-long experiments will be conducted with boiler equipment at one of the Power Stations in Kentucky. The work will improve the purity of coal as an energy source to meet EPA standards for burning and it may open new markets for Illinois Basin and Appalachian coals.

The project has two major tasks. The first will be mercury control field testing at the research site to investigate the effect of the chlorine content in the coal on mercury speciation profiles as well as emission distribution in the flue gas and solid phase. The capturing efficiency of the particulate precipitator will also be obtained. Several coals with chlorine contents ranging will be fired in the boiler. The second task will be to study the effect of the mercury content in the coal on mercury emission as well as distribution. Based on the test results, the effect of coal type on mercury capturing capability of fly ash will also be studied. A total of 10 coals will be tested for mercury emission within the 18 month-long project. Each coal will be tested for at least seven days.



## Contingency Learning and Judgment in Older Adults

Dr. Sharon Mutter, Department of Psychology, has received a five-year grant for \$1,056,800 from the National Institute on Aging at the NIH entitled “Contingency Learning and Judgment in Older Adults.” This project will acquire and use knowledge about relationships that exist between events in the environment, which is the basis for adaptive behaviors. Outcomes will en-

standing our environment, our everyday activities will have less restrictions, and greater happiness will result from understanding how to interact with new experiences and new acquaintances. Only a few studies have concerned age-related changes, so new ground will be broken by Dr. Mutter’s research. All experiments will compare performances of young (18-39) and older adults (over 60).

There are three primary parts to the project. The first part of the

related changes in explicit learning and memory processes lead older adults to experience greater deficits in explicitly acquiring and recalling information than in implicitly acquiring and using this information for improving performance in our daily lives. Part three focuses on “theory-driven” contingency judgments. Experiments will examine whether an age-related decline in the ability to inhibit the intrusion of pre-existing beliefs and expectancies leads older



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*An older individual's memory of what she has read contributes to Dr. Mutter's research.*

able better predictions, explanations and control of events in our lives, especially in everyday activities. This study will make retirement, new living arrangements, new social contacts, health and other changes associated with aging more understandable. We will be better able to cope with this period, which involves more adults than ever before. By under-

project will focus on “data-driven” contingency judgments that result from novel relationships. Does age-related decline in memory affect older adults’ ability to acquire and use novel contingency information and does reducing demands for working memory at encoding and retrieval improve this ability? The second part of the project investigates whether age-

adults to assign greater weight to their own potentially obsolete or irrelevant contingency knowledge than to novel environmental contingencies. Together, the experiments in these three parts of the study will provide a comprehensive view of older adults’ ability to acquire, retrieve and use contingency information for judgment and prediction.

## Renaissance Partnership

Dr. Roger Pankratz, College of Education and Behavioral Sciences, received a year three award from the U. S. Department of Education for \$1,290,054 to continue work with 10 universities across the country to improve teacher quality through the Renaissance Partnership. This public service effort is part of a five-year initiative funded for over \$8,000,000 to improve the quality of their graduates and teachers by focusing attention on P-12 student learning. The partner institutions are located in 10 states: California State-Fresno, Eastern Michigan, Emporia State (Kansas), Idaho State, Kentucky State, Longwood College (Virginia), Middle Tennessee State, Millersville (Pennsylvania), Southeast Missouri State and the University of Northern Iowa. These institutions produce about 6,000 teachers each year. The Renaissance

group consists of the presidents, provosts and deans of the institutions. They have collaborated on teacher preparation issues since 1989.

The partners have identified six teacher performance areas that if improved, will significantly increase learning of P-12 students taught by graduates. All institutions are developing accountability systems that provide evidence of impact on student learning. The six performance areas include aligning instruction and assessment with state and local content standards; designing instruction for all students, not just some; using multiple assessment tools to plan and guide student learning; using technology to enhance instruction and learning; analyzing and reporting learning growth of all students; and reflecting on the teaching and learning process to plan future instruction and improve performance. Preparing

teachers to fully implement these six performance areas requires a paradigm shift from teaching to learning, new organization structures and new systems of accountability.

The accountability system will annually measure and report on teacher candidates and first year graduates' ability to teach. Teacher work samples are keys to providing credible evidence of student learning. Mentoring teams of teachers and arts and science faculty guides the development of teacher candidates in the partner schools. Partnerships are being developed with business to expand learning opportunities. An electronic network is being developed to communicate about concerns, ideas, materials and results data. Finally, a research and dissemination program is being developed to guide teacher work samples, mentoring teams and program revision at each of the partner institutions.

## Precision Machining

Dr. Yalcin Ertekin, assistant professor in the Department of Architecture and Manufacturing Sciences, has received a three-year research grant of \$268,426 from the National Science Foundation, to study the "Acquisition of Manufacturing Systems for Quality Assurance in Preci-

sion Machining Processing Using Data Mining." The grant is in the Major Research Instrumentation Program at the NSF. Dr. Ertekin will develop an intelligent manufacturing controls process to enhance closed-loop control of precision milling and turning processes. He will use aluminum and steel materials to refine production of precision parts used

for most automotive and aerospace castings. Such parts are engine blocks, cylinder heads, and pistons for cars, airplane doors and bulkheads.

The sub-objective of the research aims to develop mathematical relationships between material factors and changing cutting conditions that will predict surface roughness of cast aluminum-silicon-magnesium alloys. These alloys are the most widely used aluminum casting alloys because of their excellent

casting properties for automotive and airplane parts.

The project involves Western faculty, graduate and undergraduate students, as well as industrial and public school partners. The research will establish a Precision Machining Laboratory at Western, in cooperation with industry, for use by undergraduate and graduate students and local industry for training, hands-on instruction and research. The equipment for the laboratory acquired with the grant will allow Dr. Ertekin and his students and industrial partners to conduct machinability studies for industry on their parts in a controlled laboratory environment. The findings of the project will be shared with industries and other organizations in Kentucky through the Architectural and Manufacturing Sciences Institute at WKU through workshops, short courses and a web site. The web site will describe the findings and how they can be applied to industrial settings. The project will involve high school and middle school technology education students in precision laboratory demonstrations at the annual Technology Competition for the schools.



PHOTO BY YALCIN ERTEKIN

*AMS students are programming the new Cincinnati Arrow Vercel Machining Center with Siemens Acramatic 2100 Cnc Controller for machinability tests of aluminum alloys.*